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Specification and Drawings, as originally filed, with Application for Patent Serial No.:  
2,298,358, on February 11, 2000, by PIXEL SYSTEMS INC., assignee of Edmund Mark  
Hooper, Claire Langlois and Fran  ois Cloutier, for "Method and Apparatus for the  
Display of Selected Images at Selected Times".

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# **ABSTRACT**

This invention relates to a method for the remote display of selected images at selected times and to an autonomous visual presentation system and components thereof used with such method. This method and system allows for the out-of-home advertising and information presentation industry to offer an end-to-end solution for advertisers and information providers wishing to access, via geographic, demographic and/or other selectors, a diverse network of remotely located independent electronic multimedia displays of varying format and capacity.

# **METHOD AND APPARATUS FOR THE DISPLAY OF SELECTED IMAGES AT SELECTED TIMES**

## **5 BACKGROUND OF THE INVENTION**

### **1. Field of the Invention**

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This invention relates to a method for the remote display of selected images at selected times and to an autonomous visual presentation system and components thereof used with such method. This method and system allows for the out-of-home advertising and information presentation industry to offer an end-to-end solution for advertisers and information  
15 providers wishing to access, via geographic, demographic and/or other selectors, a diverse network of remotely located independent electronic multimedia displays of varying format and capacity.

### **2. Description of Prior Art**

20

Geographic, video and similar display systems are known in the art and are often used for advertising and information presentation. Multiple display presentation systems having a set of displays for jointly reproducing, either in still or continuous motion, successive sets of correlated images according to a desired and modifiable presentation program are known.

25

Examples of such systems are shown in US patents 5,335,081 (Yamaguchi et al.), 5,488,385 (Singhal et al.), 5,692,330 (Anderson), 5,694,141 (Chee), 5,933,154 (Howard et al.), 5,361,078 (Caine), 4,866,530 (Kalua), 4,800,376 (Suga et al.) and 4,760,388 (Tatsumi et al.)

## **SUMMARY OF THE INVENTION**

30

### **Introduction**

5 An electronic control and presentation method and system for the out-of-home advertising and information presentation industry is designed to offer an end-to-end solution for advertisers and information providers wishing to access, via geographic, demographic and temporal selectors, a diverse network of remotely located independent electronic multimedia displays of varying format and capacity.

10

The system can be broken into five distinct activities:

- ◆ Scheduling
- ◆ Broadcasting
- ◆ Display sub-system control
- 15 ◆ Network monitoring
- ◆ Internet sales access

Each activity in the system preferably has the following characteristics:

- ◆ Completely autonomous standalone functionality
- 20 ◆ Optimised planning and implementation for reduced operation costs
- ◆ Active telemetry of system status
- ◆ Easy proof of broadcast

25 The autonomous system of the invention is based on a two-tier Store & Forward architecture involving independent autonomous Scheduling Servers, each with a plurality of independent workstations, connected through a high bandwidth network to one or more Transmission Servers. The Transmission Server(s) is also connected to a plurality of independent display sub-systems via an appropriate network such as a satellite network.

30 The Scheduling Server permits individual workstation operators to access the network of independent display sub-systems using geographic, demographic and temporal selectors to implement advertising and information campaigns. Matrix planning is used to allow multiple campaigns to participate in overlapping sub-sets of display sites on the network.

## 5 Scheduling:

Scheduling is performed using three different interactive methods:

- ◆ Method 1 direct: this scheduling method allows operators to access individual display sub-systems and schedule multimedia presentations at specific times and frequencies.
- 10 ◆ Method 2 playlist: this scheduling method causes a display sub-system to cycle through a playlist of content.
- ◆ Method 3 Coverage: coverage planning is a complex operation involving planning a multimedia campaign involving one or many display sub-systems. The optimisation is performed at two levels; display specific, and inter-display. This optimisation procedure takes into account the following sets of criteria:
  - 15 i) A multilevel set of industry-specific conflict detection and avoidance or attraction involving presence and timing of advertising from competing or complimentary industry members and conflicting industry interdictions. Conflicts are resolved on one display or between several displays in close proximity. Conflict management may also involve restrictions on specific advertising content at certain locations during certain time periods.
  - 20 ii) Demographic reach targets for audience specification.
  - iii) Optimisation of playlist content within a working day period (a day need not be 24-hours).
  - 25 iv) Optimisation of planning and implementation of multiple ads in complex campaigns.
  - v) Generation of display site and presentations for multiples sites to achieve campaign targets.
  - 30 vi) Schedule planning for campaigns involving random migration of content on a portion of a targeted subset of the display sub-systems on the network during the campaign. This "roaming" campaign allows greater "first sight" coverage of a targeted demographic/ geographic segment.

## Workstations

5 The workstations are linked to a Scheduling server and are programmed to allow non-experts to implement complex advertising and information campaigns according to targets previously planned by media specialists. The workstations use an optimised Graphical User Interface (GUI) to assist in the implementation of the campaigns.

10 The workstations support multiple levels of user privilege ranging from general access to supervisor level control. In this way the system allows multiple levels of verification before campaigns can be implemented on the display sub-systems network.

15 The workstation program allows the users to monitor the progression and achievement of the goals of specific advertising and information campaigns and the overall network. Complex campaigns and system status indicators are viewed using a 3-dimensional data cube designed to allow surface-type presentation of the activities of large volumes of data, campaigns and display activity.

20 A specialised version of the workstation called the "remote workstation" permits a sub-set of the workstation functionality to be accessible by service and sales operatives in the field. The remote workstations connect to the network via the Internet or other known means.

### **Broadcasting**

25

The Transmission Server is the communications control hub for the entire system. It is responsible for delivering the content and commands determined by the workstation operators to the indicated set of display sub-system sites. The Transmission Server is responsible for the overall electromechanical health of the network. As such it performs the

30 following tasks:

- ◆ Receive content and commands from the Scheduling Server(s).
  - ◆ Plan and execute an optimised transmission schedule designed to achieve just-in-time delivery of multimedia content at a minimum of cost and a maximum of reliability using
- 35 whatever means of delivery are available.



- ◆ Implement a dynamically shifting multicast/unicast transmission protocol for reduced communications costs and minimised bandwidth.
- ◆ Encrypt/decrypt data for enhanced security.
- ◆ Receive performance logs and display site telemetry for aggregations and forwarding to the Scheduling Server(s).

The primary data communications mechanism used by the Transmission Server to communicate with the display systems is preferably via bi-directional VSAT technology using small remote-site dish antennas. However, the Transmission Server is also capable of using any IP-based transmission technology such as Internet, ISDN and POTS lines.

### **Display Sub-Systems**

The display sub-systems are responsible for implementing the content presentation on the schedule which was previously inputted by the workstations. The display sub-systems preferably have the following characteristics:

- ◆ Multiple independent or synchronised channel presentation of multimedia content such as MPEG-1+2 video/frame data and on-screen overlay of text and graphical images.
- ◆ Data reception via VSAT, or other electronic transceiver technology.
- ◆ Performance data-logging for transmission of "as-run" performance logs to the Transmission Server from the Display Controller.
- ◆ Fully redundant mechanical and electronic operations.
- ◆ Operate in either primary or team mode to implement multimedia concepts requiring screen resources greater than one display sub-system can muster. In this way a display sub-system can declare itself "site master" and receive content and scheduling information for other display sub-systems. The site master will then forward and co-ordinate the activities of the team member display sub-systems.
- ◆ An Active Configuration Management protocol is built into the display sub-systems. This protocol allows the units to communicate via IP, RS-232 or other means with industry standard equipment used with display sub-systems to create special effects

5 such as lighting and sound control or video-wall support via synchronisation of the independent video outputs.

### Network Monitoring

10 The Transmission Server supports remote access for system monitoring and control. Using this mechanism, the following tools are implemented for remote access; main system data concentrator panels, and sales/marketing access programs using connection via the Internet or other known means. Concentrator panels which are large format graphical displays running on independent computer systems are used in conjunction with each Service and  
15 Transmission Centre. Each concentrator panel shows the state of the overall system. Two specific types of concentrator panels are used: the network activity monitor and the system status and transmission activity monitor.

20 The monitoring programs used to update the concentrator panels are capable of operating using direct LAN, Internet or other known connections to the system. This permits the system to be monitored by managers at remote sites using varying equipment.

### Internet Sales Access

25 The sales access programs allow sales and marketing personnel to plan and book time on the system without actually having to prepare content. The reduced bandwidth requirements permit the sales personnel to operate their stations at a customer site using an Internet connection. Each station can present the state of inventory and availability on the system. The sales personnel can begin and plan campaigns, make proposals and then leave instructions for  
30 the workstation operators to continue the required operations for implementation.

There is, therefore, provided a visual presentation system which comprises:

- 35 a) an autonomous schedule planning server itself comprised of:  
i) computer processor means for processing data;

- 5           ii) storage means for storing data on a storage medium.  
           iii) data transceiver means
- b)    an autonomous transmission optimising server itself comprised of:  
              i) computer processor means for processing data;  
10           ii) storage means for storing data on a storage medium.  
              iii) data transceiver means
- c)    at least one individual workstation itself comprised of:  
              i) computer processor means for processing data;  
15           ii) graphical interface for campaign planning, execution and follow-up;  
              iii) means for multimedia data encoding and transcoding;  
              iv) storage means for storing data on a storage medium;  
              v) transceiver means
- 20          d)    at least one visual displays sub-system comprises of:  
              i) at least one visual display screen;  
              ii) a display controller connected to said visual display screen comprising:  
                  - computer processor means for processing data;  
                  - storage means for storing data on a storage medium.  
25           - multi-media content presentation means  
              iii) data transceiver means
- e)    a first data communication network connecting said schedule planning server, said  
30           transmission optimising server and said individual workstation(s) through their  
          respective transceiver means.
- f)    a second data communication network connecting said transmission optimising server  
          and said visual display sub-system(s) through their respective transceiver means.
- 35          g)    first means for processing data to determine the availability of presentation time

- 5 periods on each said visual display sub-system;
- h) second means for processing data to select and reserve available presentation time period on each said visual display sub-system;
- 10 i) third means for processing data to associate one or more multimedia content to be displayed during each said reserved presentation time period;
- j) first means for transmitting said multimedia content to the corresponding visual display sub-system;
- 15 k) second means displaying said multimedia content on the corresponding display screen during the corresponding presentation time period.

There is also provided a visual presentation system as described above further comprising of:

- 20 a) first means for inputting and storing demographic data in relation to the geographic location of each visual display sub-system.

In a preferred embodiment [to-come]

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## DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic representation of a first embodiment of an autonomous visual presentation system in accordance with the invention. The diagram shows a system involving several service bureaux each containing a Scheduling Server and a plurality of workstations connected via high-speed connection with a Transmission centre containing a Transmission Server. The Transmission Centre is also connected via a secondary network with a diverse group of display sites each containing one or more display sub-systems.

Figure 2 is a schematic representation of a complex display sub-system in accordance with the invention.

## DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

The visual presentation system shown in figure 1 comprises a Transmission Centre 10 and several Service Bureaux 20, 30 and 40 all controlling groups of Display sites. The Transmission Centre 10 comprises a Transmission Server 100 comprising a CPU 110 a central storage 120, a first computer screen 130, a second computer screen 135, a large concentrator display panel 140 all connected to the CPU 110.

Similarly, there are provided Service Bureaux each containing Scheduling Servers 200, 300 and 400 respectively, each having a CPU, local storage, multiple workstations and one large concentrator display panel all connected to their respective CPUs 210, 310 and 410.

All of the Scheduling Servers are connected via a high bandwidth network for example Teleglobe's high bandwidth network 700. Network 700 also connects all Scheduling Servers to the Transmission Server 100.

A second network 600 connects the Transmission Server to all the individual display sub-systems 520, 521, 522, 530, 531, 532, 540, 541 and 542 via a satellite dish 500 and a Ku band satellite 550.

5 Each display sub-system comprises a satellite dish, a CPU, a storage mechanism and at least one display screen adapted to be seen by passers-by.

10 A single Service Bureau can service a given metropolitan area in which a plurality of display sub-systems can be strategically deployed inside buildings or outside where they may replace traditional billboards.

Demographic data is gathered and inputted in the central storage 120 via workstations 200, 300 and 400. Such demographic data can either be global, for a given metropolitan region and/or specific for each display.

15 The needs and preferences of each advertiser and information provider who wishes to use the visual presentation system are gathered by the sales personnel and are inputted in the database maintained in the central storage 120 via the workstations and Scheduling servers. These preferences include demographics, multimedia content, airtime preferences and  
20 budgetary constraints. All of these preferences and constraints are entered into the central storage 120 via the Scheduling Servers 200, 300 and 400. Each workstation operator can reserve air time for display sub-systems located in his/for metropolitan area or indeed in any other display sub-system connected to the Transmission Server 100 via the network 600.

25 Each workstation operator also has the option of using optimisation software contained in the Scheduling Servers to suggest a schedule to the client which will take into consideration the aforesaid constraints (demographics, content, air time and budget).

30 Once the schedule is determined, it is inputted into the system which will then prepare a playlist or schedule incorporating the needs of all the advertisers and information providers wishing to use each individual display sub-system. As each display performs its broadcast, a detailed log of all the relevant data is kept in the visual presentation system for future reference and to provide evidence to the advertisers and information providers to the effect  
35 that each given multimedia content was broadcast at a given site over a precise period of time.

5 A camera equipped with image recognition software can also be provided at each site and managed by the display sub-system to actually determine the number and characteristics of the actual audience during each broadcast. This information can be used for statistical and even billing purposes.

10 It is, of course, understood that the invention is not to be limited to the exact details of the representative visual presentation system and components thereof set forth above. A variety of departures from the foregoing disclosure may be made in order to conform to the design preferences or the requirements of each specific application of the invention. It is therefore appropriate that the invention be construed broadly and in a manner of consistent with the  
15 fair meaning or proper scope of the claims that follow.

## 5 CLAIMS

What is claimed is:

1. A visual presentation system comprising:

- 10 a) a Scheduling Server itself comprising of:  
i) computer processor means for processing data;  
ii) storage means for storing data on a storage medium;  
iii) data transceiver means
- 15 b) a Transmission Server itself comprising of:  
i) computer processor means for processing data;  
ii) storage means for storing data on a storage medium;  
iii) data transceiver means
- 20 c) at least one individual workstation itself comprising of:  
i) computer processor means for processing data;  
ii) graphical interface for campaign planning, execution and follow-up;  
iii) storage means for storing data on a storage medium;  
25 iv) media encoding/transcoding means;  
v) transceiver means
- d) at least one visual displays sub-system comprising of:  
30 i) a visual display screen;  
ii) a display controller connected to said visual display screen comprising:  
- computer processor means for processing data;  
- storage means for storing data on a storage medium.  
- means for decoding and presenting multimedia content on one or more screens.  
35 iii) data transceiver means



- 5 e) a first data communication network connecting said Scheduling Server said Transmission Server and said individual workstation(s) through their respective transceiver means.
- 10 f) a second data communication network connecting said Transmission Server and said visual display sub-system(s) through their respective transceiver means.
- g) first means for processing data to determine the availability of air time periods on each said visual display sub-system;
- 15 h) second means for processing data to select and reserve available air time period on each said visual display sub-system;
- i) third means for processing data to associate one or more multimedia content to be displayed during each said reserved time period;
- 20 j) first means for transmitting said multimedia content to the corresponding visual display sub-system;
- k) second means displaying said multimedia content on the corresponding display screen during the corresponding time period.
- 25

2. A visual presentation system as claimed in claim 1, further comprising:

- 30 a) first means for inputting and storing demographic data in relation to the geographic location of each visual display sub-system.

3. A visual presentation system as claimed in claims 1 or 2 further comprising:

- 35 a) second means for inputting and storing data related to the multimedia content preferences of each user of the visual presentation system ;

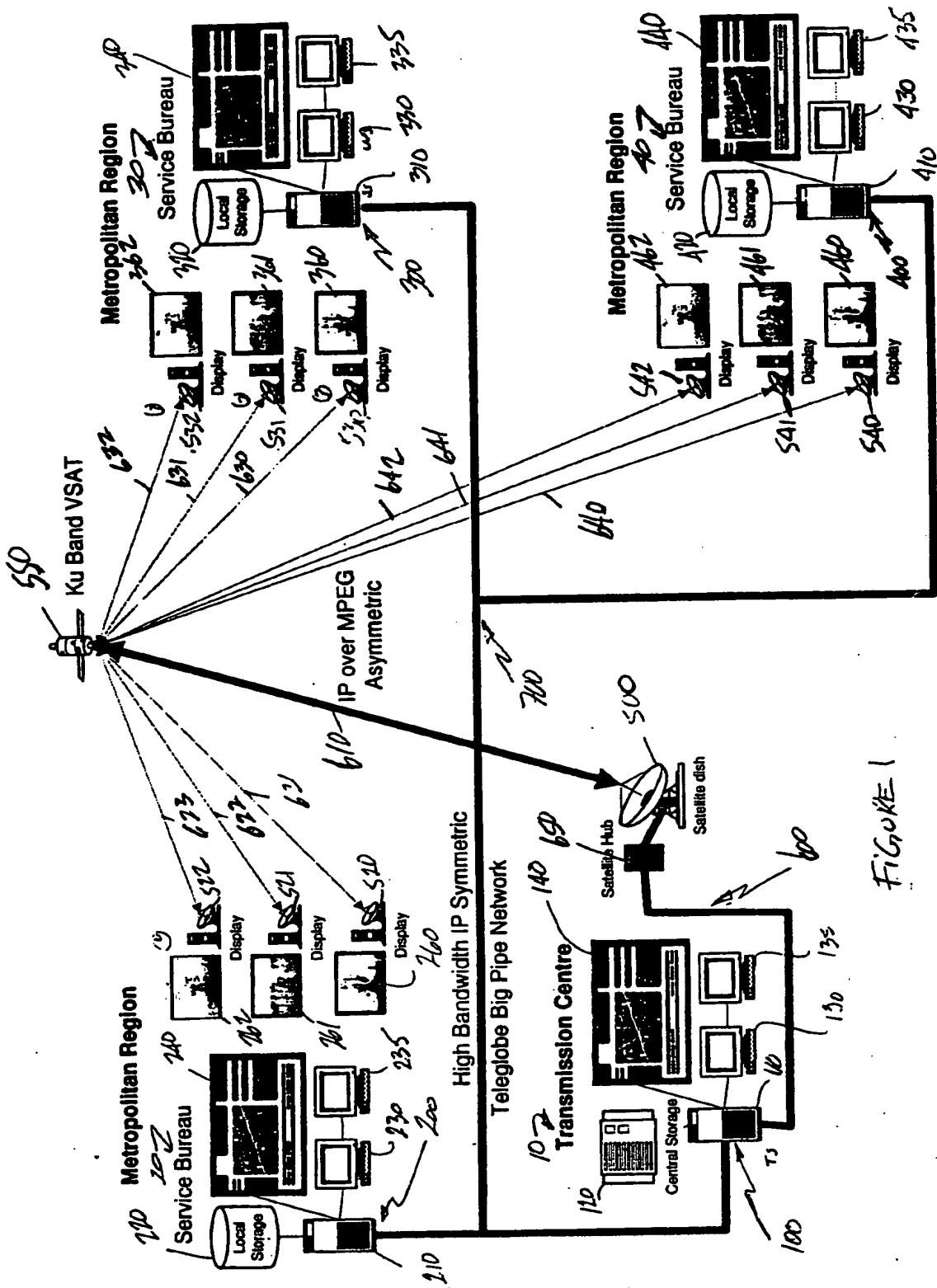
- 5      b)      third means for inputting data related to the air time period preferences of each user of the visual presentation system;
- c)      fourth means for processing data to determine for each visual display sub-system, the optimal correlation between the available air time periods, the air time period preferences, and the multimedia content preferences.
- 10

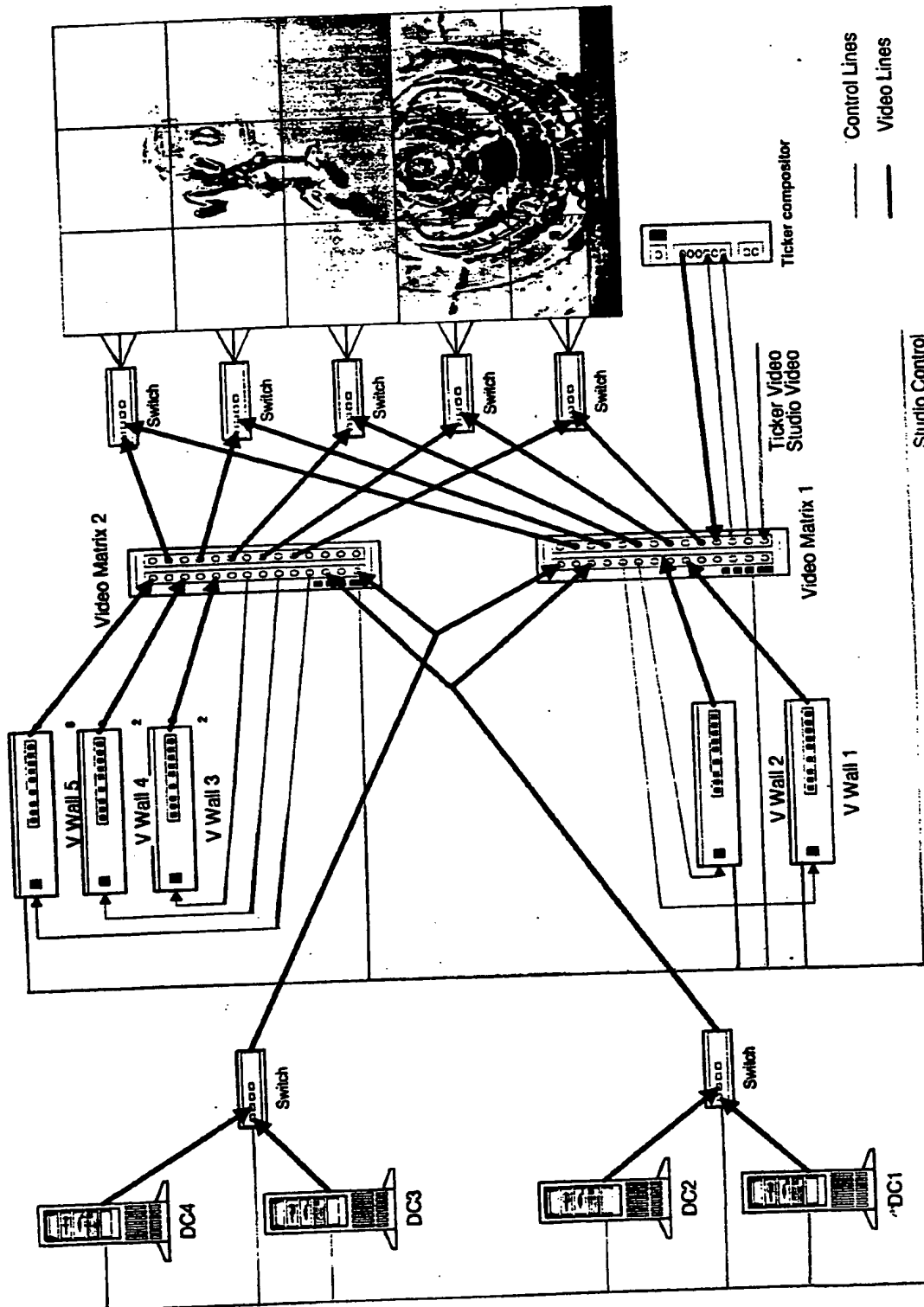
4. A visual presentation system as claimed in claim 3 further comprising of:

- 15      a)      fourth means for inputting and storing data related to the demographic preferences of each user of the visual presentation system;
- b)      fifth means for processing data to determine for each display sub-system, the optimal correlation between the available air time periods, air time period preferences, multimedia content preferences, demographic data and demographic preferences.

20      5. A visual presentation system as claimed in claims 1, 2 or 3 wherein said second data transmission network is a satellite network.

25      6. A visual presentation system as claimed in claim 1, 2 or 3 wherein said first data transmission network is a high bandwidth network.





Studio Control

FIGURE 2